

CLAIMS

What is claimed is:

1. A core for a cored composite structure comprising:

an array of unidirectional fiber-columns that extend through the core between at-least-perpendicular core surface sections; and

a core-material, with the at-least-perpendicular core surface sections, that holds the columns and that allows the columns to bond to- and to become capable of transferring force between- fiber-reinforced-polymer skin sections placed on the core surface sections when a cored composite structure is produced.

2. The core of claim 1 wherein the core-material is capable of bonding to- and transferring forces between- and has average density less than the density of- fiber-reinforced-polymer skin sections placed on the core surface sections when a cored composite structure is produced.

3. The core of claim 1 wherein the core-material is capable of being turned into fluid for substantial removal after fiber-reinforced polymer skins sections are placed and unidirectional fiber-columns are bonded and capable of transferring forces when a cored composite structure is produced.

4. The core of claim 1 wherein the array comprises at least one unidirectional fiber-column that is selected from the group consisting of: fiber-polymer composite, all-fiber, all-fiber in a hole through the core-material that can become a fiber-polymer composite when a cored composite structure is produced.

5. The core of claim 1 wherein the core-material includes at least one channel that aids filling unidirectional fiber-columns, which are all-fiber in a hole through the core-material, with polymer when a cored composite structure is produced.

6. The core of claim 1 wherein the array includes unidirectional fiber-columns with fibers extending from at least one column end that are capable of bonding to- and becoming part of- a fiber-reinforced-polymer skin section when a core composite structure is produced.

7. The core of claim 6 wherein the fibers extending from the at least one column end hold a fiber layer on at least one core surface section so that the fibers are capable of bonding to- and becoming part of- a fiber-reinforced polymer skin section at a distance from the core surface when a cored composite structure is produced.

8. The core of claim 1 wherein the array includes unidirectional fiber-columns that vary in at least one of the following: size, shape, fiber content, angle relative to core surface sections, spacing between columns.

9. The core of claim 1 wherein the array includes intersecting unidirectional fiber-columns.

10. The core of claim 1 wherein the unidirectional fiber-columns have minimum cross-section area less than 0.25 times the square of the length of the shortest line that can be drawn within the column between core surface sections.

11. A core of a cored composite structure comprising:

an array of unidirectional fiber-columns bonded to- and capable of transferring force between- fiber-reinforced-polymer skin sections on at-least-perpendicular core surface sections; and

a core-material, with the at least perpendicular core surface sections, bonded to- and capable of transferring force between- and has average density less than the density of- skin sections on the core surface sections.

12. The core of claim 11 wherein the array comprises at least one unidirectional fiber-column that is selected from the group consisting of: fiber-polymer composite, all-fiber.

13. The core of claim 11 wherein the array includes unidirectional fiber-columns that vary in at least one of the following: size, shape, fiber content, angle relative to core surface sections, spacing between columns.

14. The core of claim 11 wherein the array includes intersecting unidirectional fiber-columns.

15. The core of claim 11 wherein the unidirectional fiber-columns have minimum cross-section area less than 0.25 times the square of the length of the shortest line that can be drawn within the column between core surface sections.

16. A core of a cored composite structure comprising:

an array of unidirectional fiber-columns bonded to- and capable of transferring force between- fiber-reinforced-polymer skin sections on at-least-perpendicular core surface sections;

open volume that remains when core-material that defined the at-least-perpendicular core surface sections and held the array of unidirectional fiber-columns while the columns were bonded to the fiber-reinforced polymer skin sections was substantially removed from the composite structure; and

any residual core material.

17. The core of claim 16 wherein the array comprises at least one unidirectional fiber-column that is selected from the group consisting of: fiber-polymer composite, all-fiber.

18. The core of claim 16 wherein the array includes unidirectional fiber-columns that vary in at least one of the following: size, shape, fiber content, angle relative to core surface sections, spacing between columns.

19. The core of claim 16 wherein the array includes intersecting unidirectional fiber-columns.

20. The core of claim 16 wherein the unidirectional fiber-columns have minimum cross-section area less than 0.25 times the square of the length of the shortest line that can be drawn within the column between core surface sections.